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Clinical evaluation of circulating microRNAs as potential biomarkers of hepatocellular carcinoma in patients with chronic HBV infection

G.P. Caviglia¹, M.L. Abate¹, E. Petrini², S. Gaia², P. Manzini³, P. Carucci², M. Rizzetto^{1,2}, A. Smedile^{1,2}

¹*Department of Medical Sciences, University of Turin, Turin, Italy*

²*Department of Gastroenterology and Hepatology, Città della Salute e della Scienza Hospital, Turin, Italy*

³*Blood Bank, Città della Salute e della Scienza Hospital, Turin, Italy*

Introduction. Several studies showed that aberrant miRNA expression is associated with development and progression of hepatocellular carcinoma (HCC).

Aim. To examine whether some commonly deregulated miRNAs (miR-122, miR-21, miR-221 and miR-16) in HBV-related HCC may serve as diagnostic markers.

Materials and Methods. Serum expression of miR-122, miR-21, miR-221 and miR-16 was evaluated by real-time quantitative RT-PCR in 33 patients with HBV-related HCC (61±10 years; F/M=4/29), 30 patients with HBV-related cirrhosis (53±11 years; F/M=11/19) and 27 blood donors as healthy controls (54±8 years; F/M=9/18).

Results. Median levels of miR-16, miR-122 and miR-221 were significantly different in patients with HCC or cirrhosis compared to healthy controls ($p<0.001$) whereas, only miR-122 levels differed in patients with HCC from cirrhotic patients ($p=0.024$). miR-122 levels were significantly higher in patients with multifocal HCC than in patients with a single lesion ($p=0.024$). Expression levels of miR-21 were similar in the 3 groups. Area under the curve (AUC) analysis showed that serum levels of miR-122, miR-122+miR-221, miR-122+miR-16 and miR-122+miR-221+miR-16, are able to differentiate patients with HCC from patients with cirrhosis (AUC=0.675; AUC=0.704; AUC=0.681; AUC=0.703, respectively). Moreover, miR-16, miR-122 and miR-221, alone or in combination, were able to discriminate patients with HCC or cirrhosis from healthy controls (AUC>0.9). In addition, a correlation between miR-122 levels and HCC nodules number ($R=0.390$; $p=0.036$), and between miR-16 and miR-122 levels, and ALT values ($R= -0.464$, $p=0.034$; $R=0.449$, $p=0.536$, respectively) was found.

Conclusions. Among the four microRNAs analyzed, only miR-122 significantly discriminates patients with HCC from cirrhotic patients and patients with HCC or cirrhosis from controls. miR-122 appears to reflect liver necro-inflammation, since we observed a positive correlation with ALT levels. Moreover, the correlation between miR-122 expression levels and HCC with multi-nodules, suggests the possible use of this miRNA for tumor stadiation. Nevertheless, miR-122 AUC values were not sufficiently high for HCC screening purposes.